

Elbe Tunnel – City of Hamburg, Germany

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“By using upward-compatible, standard software from Wonderware, we were able – even in the first phase in 1996 – to lay the foundations for later expansions. There has never been a need for an expensive, time-consuming renewal of the InTouch application for version upgrades.”

*Olaf Kolmer
Project Manager, Cegelec AT GmbH*

Elbe Tunnel Moves into the Future with Wonderware Software

Goals

- Monitor and control traffic through the underwater tunnel, which averages 142,000 vehicles per day
- Regulate tunnel ventilation, lighting, safety and emergency systems

Challenges

- The four-tunnel system includes approximately 850 control points
- The tunnel is over 34 years old, and continual updates are required to keep the project modernized

Solutions and Products

- Wonderware InTouch® HMI

Results

- An open, highly scalable system featuring Wonderware software has enabled easy integration of technology additions and upgrades
- Expansion of the facilities management system has become more cost effective and time efficient



Hamburg, Germany – A harbor city nicknamed “The Gateway to the World,” Hamburg is home to one of the most amazing underwater tunnels ever built. First opened in 1975, the Elbe Tunnel has grown along with the city and provides an invaluable link between northern Germany and Denmark for residents, tourists and business people.

Now, eight lanes of traffic carry an average of 142,000 vehicles through the 3.1 kilometer (1.9 mile) tunnel daily. An extensive traffic control and safety system is in place, including signals, message signs and barriers that provide guidance.

Planning for Multiple Goals

Given the changes in technology since the Elbe Tunnel was built, it is evident that city planners have been forward-looking from the very beginning. In 1995, work began to enlarge the then-20-year-old structure. In 2002, a fourth bore with two additional traffic lanes and three emergency exit tunnels became available.

Hamburg officials knew that increasing capacity was only part of the solution. An updated control system to ensure the tunnel’s efficient operation and safety was also critical. Their goal was to future-proof the Elbe Tunnel by implementing a modular and open system. With it, further expansions could build upon the existing facilities management and control deployment and increase the return on investment for the project.

With a modular and open system, further expansions could build upon the existing FMS deployment and increase the return on investment for the project.

State-of-the-Art Monitoring and Control

The new Wonderware software solution was chosen by the city and developed in conjunction with Cegelec AT GmbH. Wonderware’s proven ability to provide the latest capabilities within

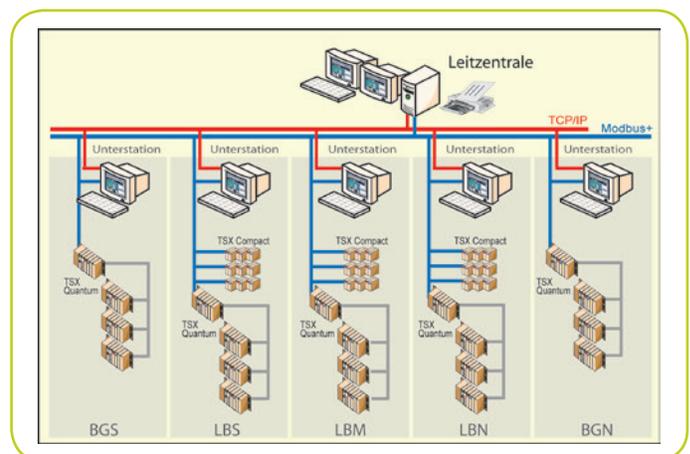
an open environment complemented Cegelec’s system integration expertise and experience in developing custom functionality.

The new, open system would be anchored by the Wonderware InTouch® Human Machine Interface (HMI) and would monitor and manage multiple components of the tunnel’s operations, including:

- Ventilation
- High-voltage electrical power
- Low- and medium-voltage switching
- Emergency management and call facilities
- Fire safety and hydrants
- Pump plants and drainage
- Lighting
- Temperature
- Load monitoring
- Control of recess doors

Upon completion, the new facilities management system (FMS) for the Elbe Tunnel incorporated a total of 850 control points and 72 visual monitors as well as innovations to aid tunnel operators in their around-the-clock responsibilities:

- The Wonderware InTouch software provides a consistent screen design that enables all operators to view and control tunnel operations. Operators can see the entire system diagram,



or may choose to click on any one of 40 specific areas for more information.

- The Wonderware solution also supports the important safety functions that are built into the tunnel. Alarms and their response status can be seen at a glance on all operator screens.
- Various peripherals that support the system are connected via Wonderware InTouch. For example, specific events and faults trigger the video cameras in the tunnel, which immediately swivel into position and activate the corresponding monitor to help the operator diagnose the situation.
- For security and redundancy, the computers in the central control unit are linked to others throughout the facility. And while each computer is independent and has its own database, if one fails, the system can be accessed and controlled by another computer on the network. And when the failed computer returns to service, its database automatically updates through the network connection.

Expansion and Scalability

The new facilities management system has met the requirements of the City of Hamburg and the many people who depend on the tunnel each day. But just as importantly, it will meet the needs of the future.

As the modernization and expansion of the tunnel continues, the standardization that is built in to the Wonderware software will contribute in key ways. When adding new components and subsystems, the Wonderware Graphics Library provides easy-to-use, pre-built images that help engineers design quickly and save costs. And because learning the software is so intuitive, training is efficient as well.

Additionally, Wonderware software is developed to ensure upward compatibility. Applications that were first implemented in 1995 when the



Elbe Tunnel's expansion project began are still supported to the current version release, since the Wonderware software is kept updated through an easy migration process.

Connecting to the Future

Because the Wonderware software is based on industry standards and provides maximum repeatability, the FMS can be expanded at any time, quickly and at the most reasonable cost. The solution is an important part of how Hamburg is fulfilling its reputation as an international travel destination. And with Wonderware software, the Elbe Tunnel is one of the most highly used, modern – and safest – underwater tunnels in the world.



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